

Work Order ID 135135

135135

Page 1

July 31, 2015 9:18:02 AM

Item ID: D412-596-203TRN Accept *N900040100* Setup Start *NS1*
 Revision ID: Stop *NS2*
 Item Name: Crosstube Aft Extended Turning Detail
 Start Date: 7/29/2015 Start Qty: 1.00 *1* Cust Item ID:
 Required Date: 8/12/2015 Req'd Qty: 1.00 *1* Customer:
 Reference:

Approvals: Process Plan 61A Date: 20150731 Tooling: _____ Date: _____ Run Start *NR1*
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr
D412-596-203	B PA1 U/R

15/12/31

100 0.00
100 MORI SEIKI CNC LATHE LARGE
 Mori Seiki Memo 0.00
 Mori Seiki CNC Lathe Large 1-Cut tube on chop saw, leave extra mat'l for facing.
 2-Face tube to length.

1 ϕ
 mm L
 15/12/01

110 0.00
110 QC1- Inspection performed by CMM
 QC Memo 0.00
 Quality Control

1 ϕ
 mm L
 15/12/03

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐							
Date :		Step #:		QTY Effective :				MRB (QSI042) Approval			
Description Work Order Deviation				Disposition				Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval			
Root Cause		FAULT CATEGORY									
Environment ☐	No Re-verification ☐	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐	Design ☐	Operator ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐
Doc/Data ☐	Offset/Setup ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐	Equip/Tooling ☐	Supplier ☐	Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐
Handling/Pre ☐	Training ☐	Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐	Material ☐	Use for Testing ☐	Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐
Internal Transport ☐	Poor Information ☐	Crushing ☐	Countersink ☐	Off-set ☐	Drawing ☐	Tribal Knowledge ☐	Rushing ☐	Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐
LOA ☐	Product Improvement ☐	Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐	Substation ☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐
Past Expiry Date ☐	Manufacturing Process ☐	OTHER :									
Misidentified ☐	Past Due ☐										

Work Order ID 135135***135135***

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July 31, 2015 9:18:02 AM

Item ID: D412-596-203TRN

Accept

N900040100

Setup Start

NS1

Revision ID:

Stop

NS2

Item Name: Crosstube Aft Extended Turning Detail

Start Date: 7/29/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 8/12/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start

NR1

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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120

0.00

120

MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

0.00

Mori Seiki CNC Lathe Large

1-Fill tube with sand & install plugs on both ends
2-Turn as per Folio FB177
3- File transition lines smooth.
4-Scribe part # as per Dwg D412-596-203
FOLIO REV: AA
DWG REV: 12

1 0

mml
15/12/07

130

QC1- Inspection performed by CMM

0.00

130

QC

Memo

0.00

Quality Control

1 0

mml
15/12/08

140

QC8- Inspect parts - second check

0.00

140

QC

Memo

0.00

Quality Control

1 0

DAS
47
9-89

15-12-14

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS <table style="width:100%; border: none;"> <tr> <td style="border: none;">Skid-tube ☐</td> <td style="border: none;">Cross tube ☐</td> <td style="border: none;">Water Jet ☐</td> <td style="border: none;">Engineering ☐</td> </tr> <tr> <td style="border: none;">Machining ☐</td> <td style="border: none;">Small Fab ☐</td> <td style="border: none;">Prod. Eng. Coord. ☐</td> <td style="border: none;">Quality ☐</td> </tr> <tr> <td style="border: none;">Thermoforming ☐</td> <td style="border: none;">Finishing ☐</td> <td style="border: none;">Rec/Store/Packaging ☐</td> <td style="border: none;">Other ☐</td> </tr> <tr> <td style="border: none;">Large Fab ☐</td> <td style="border: none;">Composite ☐</td> <td style="border: none;">Supplier ☐</td> <td></td> </tr> </table>				Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐																																																									
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Work Order ID 135135

135135

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July 31, 2015 9:18:02 AM

Item ID: D412-596-203TRN Accept ***N900040100*** Setup Start ***NS1***
 Revision ID: Stop ***NS2***
 Item Name: Crosstube Aft Extended Turning Detail
 Start Date: 7/29/2015 Start Qty: 1.00 ***1*** Cust Item ID:
 Required Date: 8/12/2015 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150	Large Fab	0.00							
150									
Crosstubes	Memo	0.00							
Crosstubes	Grind machining marks smooth longitude way.								
180	QC15- Crosstube Dimensional Check	0.00							
180									
QC	QCS DAS Memo 9-89	0.00							
Quality Control									
190	Identify as per dwg & Stock Location: <u>6603</u>	0.00							
190	Packaging								
Packaging	Memo	0.00							
Packaging	Identify and stock in kanban rack Location: _____								

NTW 15-12-22

DEC 23 2015 DAS 9 9-89

NTW 15-12-22

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QS1042) Approval		
Description Work Order Deviation				Disposition				Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval	
Root Cause		FAULT CATEGORY							
Environment ☐	No Re-verification ☐	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐				
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Past Expiry Date ☐	Manufacturing Process ☐								
Misidentified ☐	Past Due ☐	OTHER : _____							

Work Order ID 135135***135135***

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July 31, 2015 9:18:02 AM

Item ID: D412-596-203TRN

Accept

N900040100

Setup Start

NS1

Revision ID:

Stop

NS2

Item Name: Crosstube Aft Extended Turning Detail

Start Date: 7/29/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 8/12/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan: _____

Date: _____

Tooling: _____

Date: _____

Run Start

NR1

QC: _____

Date: _____

SPC (Y/N): _____

Date: _____

Stop

NR2Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

200

QC21- Final Inspection - Work Order Release

0.00

200

QC

Memo

0.00

Quality Control

MLJ

DEC 23 2015

SH 20151222

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS <table style="width:100%; border: none;"> <tr> <td style="width:15%;">Skid-tube ☐</td> <td style="width:15%;">Cross tube ☐</td> <td style="width:15%;">Water Jet ☐</td> <td style="width:15%;">Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>						Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐	
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Past Expiry Date ☐	Manufacturing Process ☐	OTHER : _____																							
Misidentified ☐	Past Due ☐																								

Picklist Print

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Work Order ID: 135135

135135

Parent Item: D412-596-203TRN

D412-596-203TRN

Parent Item Name: Crosstube Aft Extended Turning Detail

Start Date: 7/29/2015

Required Date: 8/12/2015

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP REV: A NEW ISSUE JFS 13/03/22 VERIFY BY: DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6020-160		Manufactured	No			100	Each	17.0000	1	1			
D6020-160									**				
Crosstube Material													

Location

Loc Qty

Loc Code

HALL

5

126259

5

SHED

12

126259

12

1 mm L 15/12/01

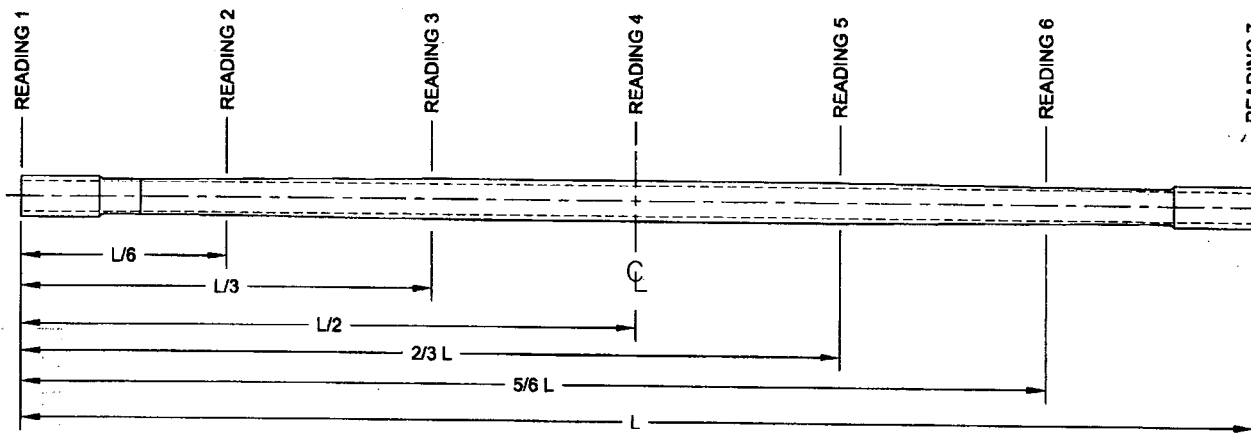
DART AEROSPACE LTD	Work Order:	135135
Description: Crosstube Assembly (412 Hi Hi Aft)	Part Number:	D412-596-203
Inspection Dwg: D412-596-203 Rev: B		Page 1 of 2

FIRST ARTICLE INSPECTION CHECKLIST

Inspection Sheet	Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	R0.50	+/-0.010	.500	/		R6	
	8.44	+/-0.060	8.44	~		vern	CNC-08
	Ø3.250	+0.000/-0.010	3.248	=		↓	
	Ø2.875	+0.005/-0.000	2.875	=			
	Ø2.875	+0.005/-0.000	2.877	/			
	Ø2.935	+0.005/-0.000	2.937	/			
	Ø2.999	+0.005/-0.000	3.001	/			
	Ø3.063	+0.005/-0.000	3.067	/			
	Ø3.125	+0.005/-0.000	3.128	/			
	Ø3.250	+0.005/-0.000	3.255	/			
SIDE B	R0.50	+/-0.010	.500	/		R6	
	8.44	+/-0.060	8.44	=		vern	CNC-08
	Ø3.250	+0.000/-0.010	3.249	/		↓	
	Ø2.875	+0.005/-0.000	2.875	/			
	Ø2.875	+0.005/-0.000	2.877	/			
	Ø2.935	+0.005/-0.000	2.937	/			
	Ø2.999	+0.005/-0.000	3.000	/			
	Ø3.063	+0.005/-0.000	3.066	/			
	Ø3.125	+0.005/-0.000	3.129	=			
	Ø3.250	+0.005/-0.000	3.255	=			
	151.38	+/-0.060	151.38	/		tape	LG-11

DART AEROSPACE LTD		Work Order: 135135
Description: Crosstube Assembly (412 Hi Hi Aft)		Part Number: D412-596-203
Inspection Dwg: D412-596-203 Rev: B		Page 2 of 2

WALL THICKNESS MEASUREMENT



Location	WALL THICKNESS MEASUREMENT (IN)				Deviation Δw (max-min)	TOLERANCE
	w1	w2	w3	w4		
READING 1 L= 0"	.436	.438	.445	.444	-.009	0.073
READING 2 L= 25	.260	.259	.270	.271	.012	
READING 3 L= 51	.350	.345	.346	.347	-.005	
READING 4 L= 76	.444	.448	.443	.441	-.007	
READING 5 L= 101	.341	.350	.346	.341	-.009	
READING 6 L= 127	.265	.262	.260	.261	-.005	
READING 7 L= 151	.441	.440	.441	.439	.002	

Calibration Result

Actual Block Thickness: .100 .500

DAS 47 Sitiescan 250 Measured Thickness: .100 .500

Measured by: <i>mgm L</i>
Date: 15/12/08

Audited by: 9-89
Date: 15-12-18

Preliminary Approval:
Date:

Rev	Date	Change	Revised by	Approved
A	15.04.27	New Issue	KJ <i>[Signature]</i>	<i>[Signature]</i>

Item	Qty -203	Part Number	Description
1	X	D412-596-203	CROSSTUBE ASSEMBLY (412 HI HI AFT)
2	1	D8020-170	CROSSTUBE MATERIAL
3	2	D3595-063-530	RUBBER CUSHION
4	1	D4909-1	SUPPORT
5	2	D4910-1	CHAFING SHIELD
7	4	MS21920-26	CLAMP
8	2	MS21920-28	CLAMP
9	A/R	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD
10	A/R	PROSEAL 890	SEALANT

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D8020-170
FINISHED LENGTH = 161.38±0.060 (BEFORE BENDING/TRIMMING)
- 2) FINISH: PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (ZIN B8-2, HATCHED AREA)
PAINT OUTSIDE PER DART QSI 005 4.2
AFTER PAINTING, REMOVE MASKING AND APPLY MATTE CLEAR COAT PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART P/N "D412-596-203" AND B/N ON INSIDE OF CUFF PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 191.1 lb RAW MATERIAL, 118.3 lb AFTER MACHINING
116.0 lb FINISHED WEIGHT
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

BENDING

- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 7% (BASED ON O.D.) IN LOWER HALF OF R35 BEND AND 6% (BASED ON O.D.) ON REMAINING TUBE.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038. TO BE PERFORMED AFTER FINAL POST-BEND GRINDING. ANY ADDITIONAL GRINDING REQUIRES ANOTHER LPI INSPECTION.

ASSEMBLY

- 12) INSTALL D4909-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015.
- 13) INSTALL MS21920-28 CLAMPS WITH D3595-063-530 RUBBER CUSHIONS TO SECURE THE D4909-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) IF NOT ALREADY PRESENT ON CHAFING SHIELD, APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D4910-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D4910-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.
- 15) TORQUE CLAMPS ON D4909-1 SUPPORT 80 TO 100 IN-LB. TORQUE CLAMPS ON D4910-1 CHAFING SHIELD 40 TO 50 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVES HAVE CURED FOR 24 HOURS.

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11/17/24
URF 14-601
9/4/24

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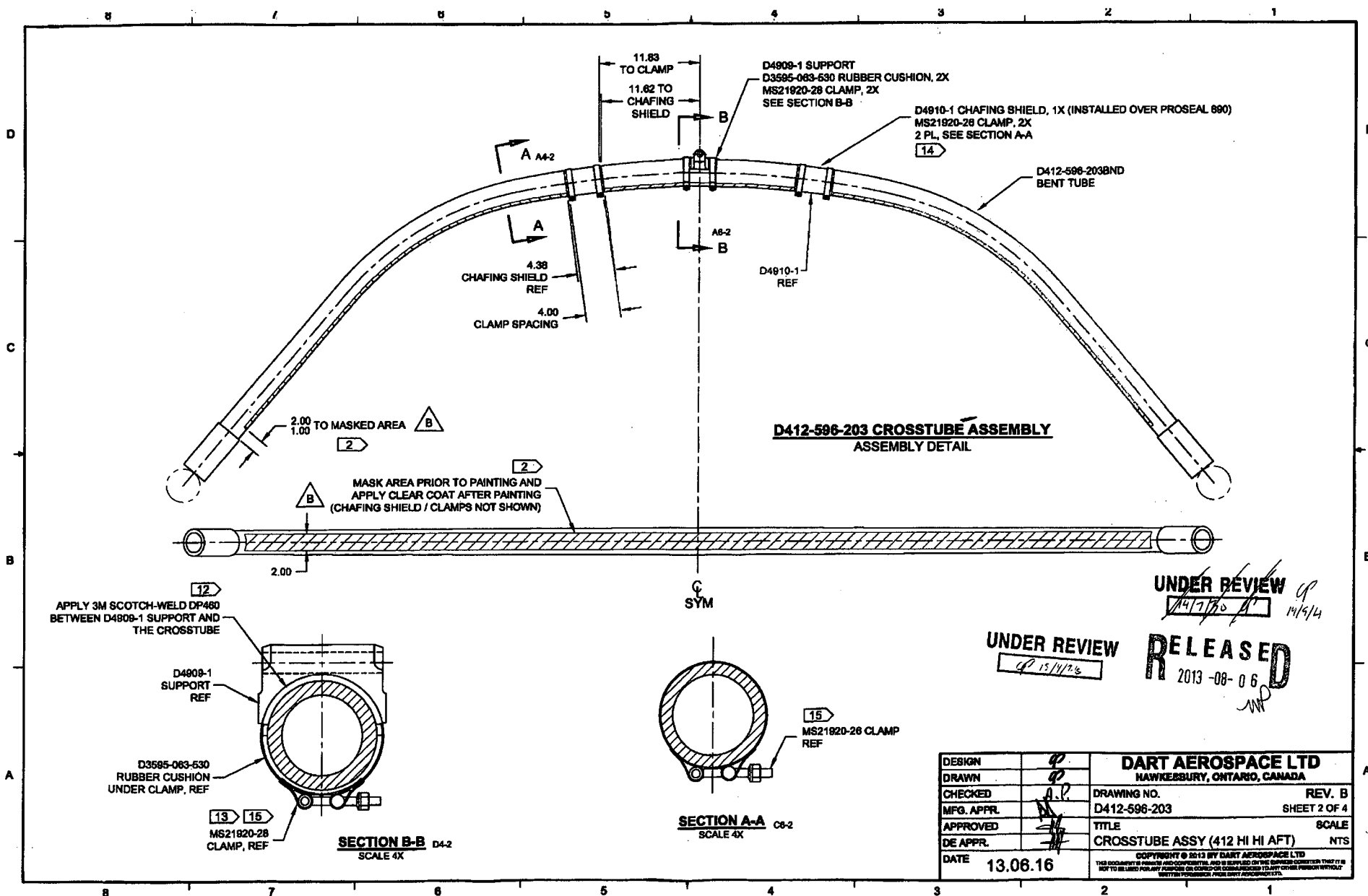
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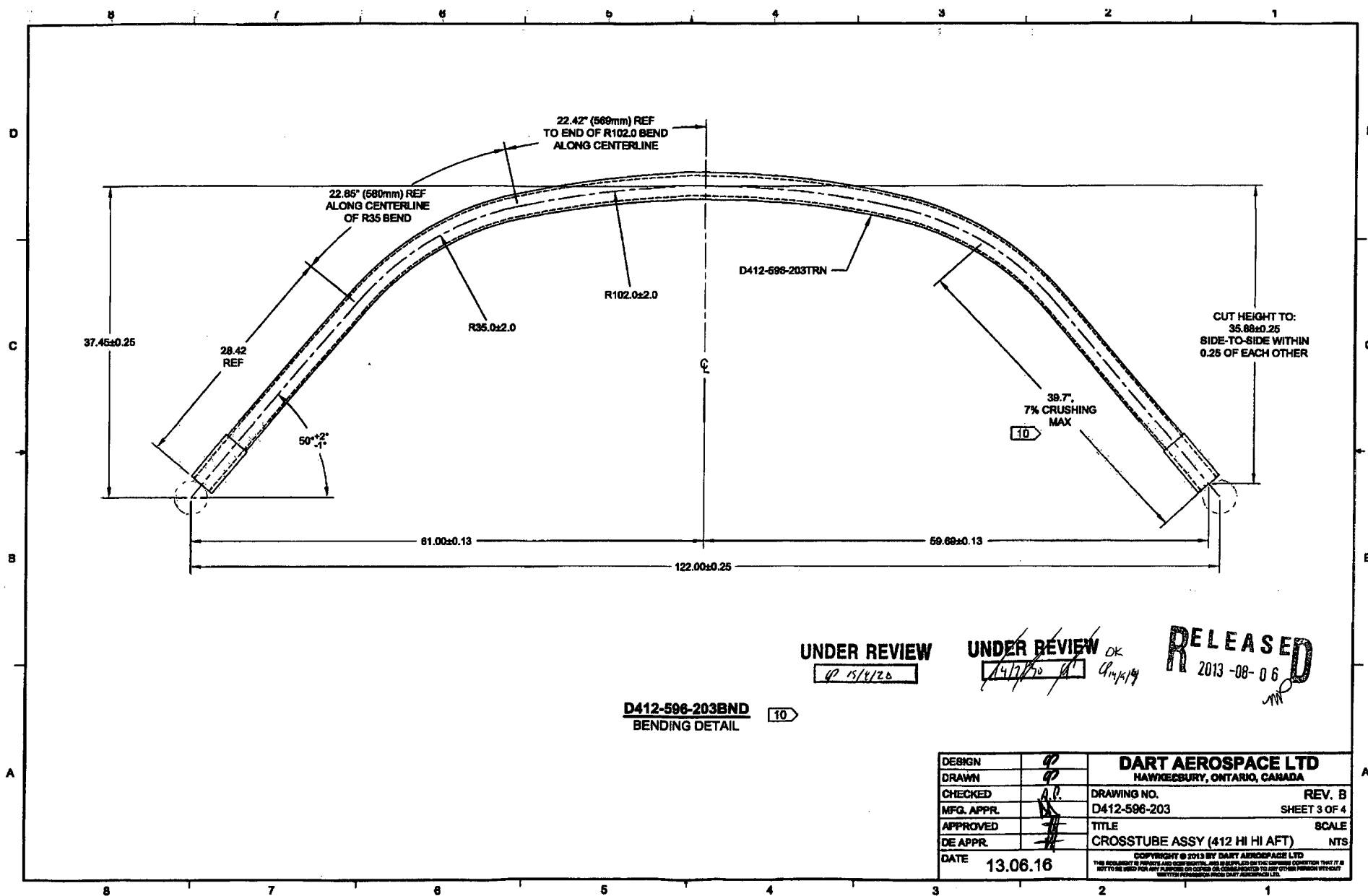
15/14/24
URF 15-561

135135
20150731

B	ADD INSPECTION WINDOW (ZIN C8-1, B8-2)	CP	13.06.16
A	NEW ISSUE	CP	13.03.13
REV.	DESCRIPTION	BY	DATE
DESIGN	92		
DRAWN	92		
CHECKED	AP		
MFG. APPR.	11		
APPROVED	11		
DE APPR.	11		
DATE	13.06.16		

DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D412-596-203	REV. B
TITLE CROSSTUBE ASSY (412 HI HI AFT)	SCALE NTS
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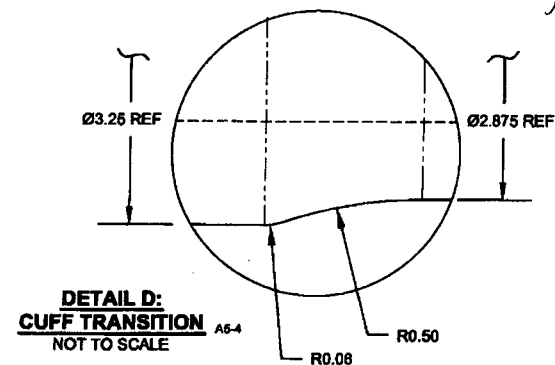
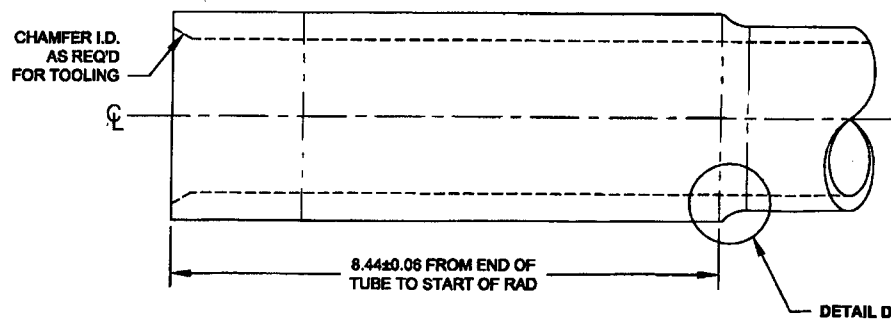
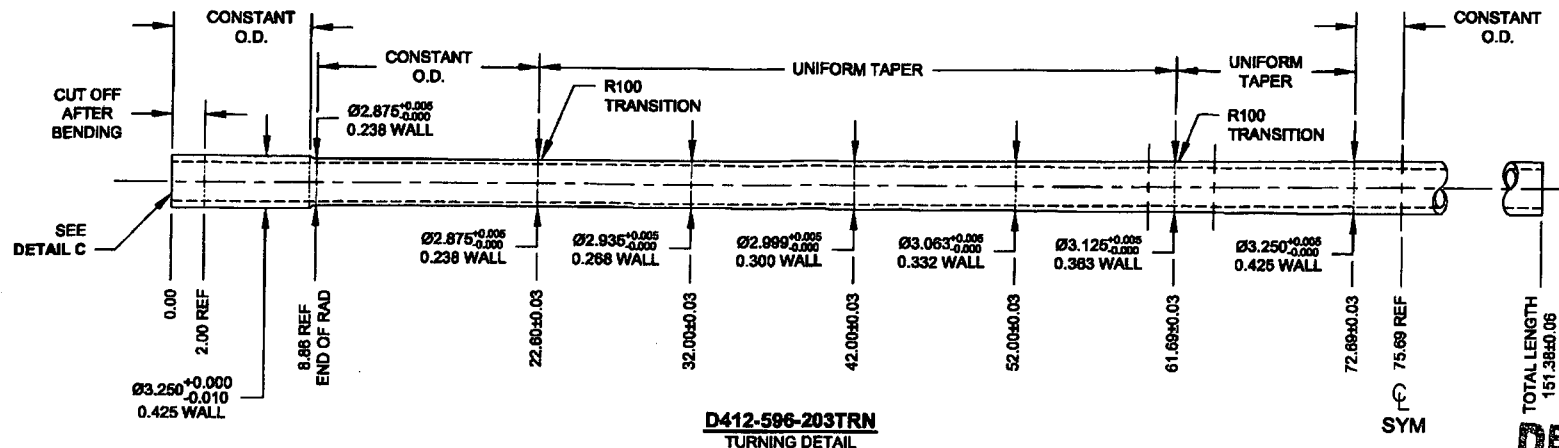
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MFG. APPR.	#	D412-596-203	SHEET 3 OF 4
APPROVED	#	TITLE	SCALE
DE APPR.	#	CROSSTUBE ASSY (412 HI HI AFT)	NTS
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MFG. APPR.	<i>JS</i>	D412-596-203	SHEET 4 OF 4
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DE APPR.	<i>JS</i>	CROSSTUBE ASSY (412 HI HI AFT)	NTS
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